4. PLACE: Natural & Cultural Resources

OVERVIEW

Natural, cultural, and historic features contribute to the character of Amherst. The Town's aesthetic appeal includes rivers and streams networked throughout the Town, the backdrop of the Holyoke Range in the south, and the Pelham Hills in the east. Amherst's historic appeal, enhanced by such resources as the Emily Dickinson homestead, attracts tourists from great distances.

This chapter examines the natural features and resources in the Town of Amherst. Inventory and analysis of the water resources, potential contaminated sites, flood plains, soils, wetlands, and protected and conservation lands are provided. The cultural and historic resources of the Town are also explored.

The following reports were utilized in developing the content of this chapter: *Amherst Preservation Plan (2005), Draft Open Space & Recreation Plan (2003),* and the *Amherst Comprehensive Planning Study: Defining Village Boundaries & Open Space Preservation Strategies (2004).* The existing conditions of Amherst's natural features were assessed by the use of Geographical Information System (GIS) maps, the US Department of Agricultural (USDA) Soil Survey, and US Federal Emergency Management Agency (FEMA) Flood Maps.

After this Overview, the document is organized into the following sections:

- **Key Findings** – The key findings represent a summary of important conclusions drawn by the consulting team.
- **Detailed Information** – This section provides the background documentation for the key findings. It is divided into six parts:
  A. Natural Features
  B. Water Resources
  C. Farmland
  D. Conservation Areas
  E. Historic and Cultural Resources
  F. University and College Resources

KEY FINDINGS

~~A.~~1. Natural Features

- Amherst's undulating topography adds to the aesthetic value of the Town and offers areas of hiking and recreation.
- The soil composition in Amherst is a product of the glacial Lake Hitchcock that covered a majority of the Connecticut River Basin. The Town's diverse soil makeup creates the prime farmland found in the area, and is also suitable for urbanized development.
- Lawrence Swamp is a significant wetland in Amherst and is the habitat for rare species according to the Natural Heritage and Endangered Species Program (NHESP).

~~B.~~2. Water Resources

- The Massachusetts Department of Environmental Protection identifies approximately 53 acres of water covering the Town, including the Mill and Fort Rivers, both major tributaries of the Connecticut River.
- All of the Town public water drinking wells are located in the Zone II Lawrence Swamp Aquifer.
- It is important to protect the public water supply by implementing Best Management Practices (BMPs) in DEP Zone II designated areas.
- The Massachusetts Department of Environmental Protection identified approximately 121 potential contaminated sites.

~~C.~~3. Farmland

- Of Amherst's 2,566 acres of farmland, 1,841 acres are protected under Agricultural Preservation Restrictions (ARP).
- Due to past development, Amherst has lost 1,164 acres of forest and farmland since 1971.
- Farmland acreage not currently under ARP is considered vulnerable due to potential land development.

- As a region, the Pioneer Valley has experienced a loss of undeveloped land such as open space and farmland.
- The development of *Valley Vision* by the Pioneer Valley Planning Commission aims to protect the open space and farmland by use of smart growth tactics.

~~D.~~4. Conservation Areas

- According to the Town's Land Use Map, 2,573 acres of Amherst's land are protected for conservation purposes due to efforts by both the Amherst Conservation Committee and the Massachusetts Department of Conservation and Recreation.
- Due to potential land and transportation development, specific areas of open space and viewsheds are identified as vulnerable.

5. Historic and Cultural Resources

- Amherst has inventoried over 900 properties on the National Register of Historic Places and has put forth a Preservation Plan to continue to increase the inventory.

~~F.~~6. University and College Resources

- Amherst College, Hampshire College, and the University of Massachusetts have museums and galleries that provide resources for exploring cultural and historic aspects of the Town. UMASS provides outreach and extension programs (such as the Natural Resources and Environmental Conservation Extension Program) to help protect the surrounding natural resources.

DETAILED INFORMATION

This section includes more detailed explanations and supporting data for the Key Findings listed above.

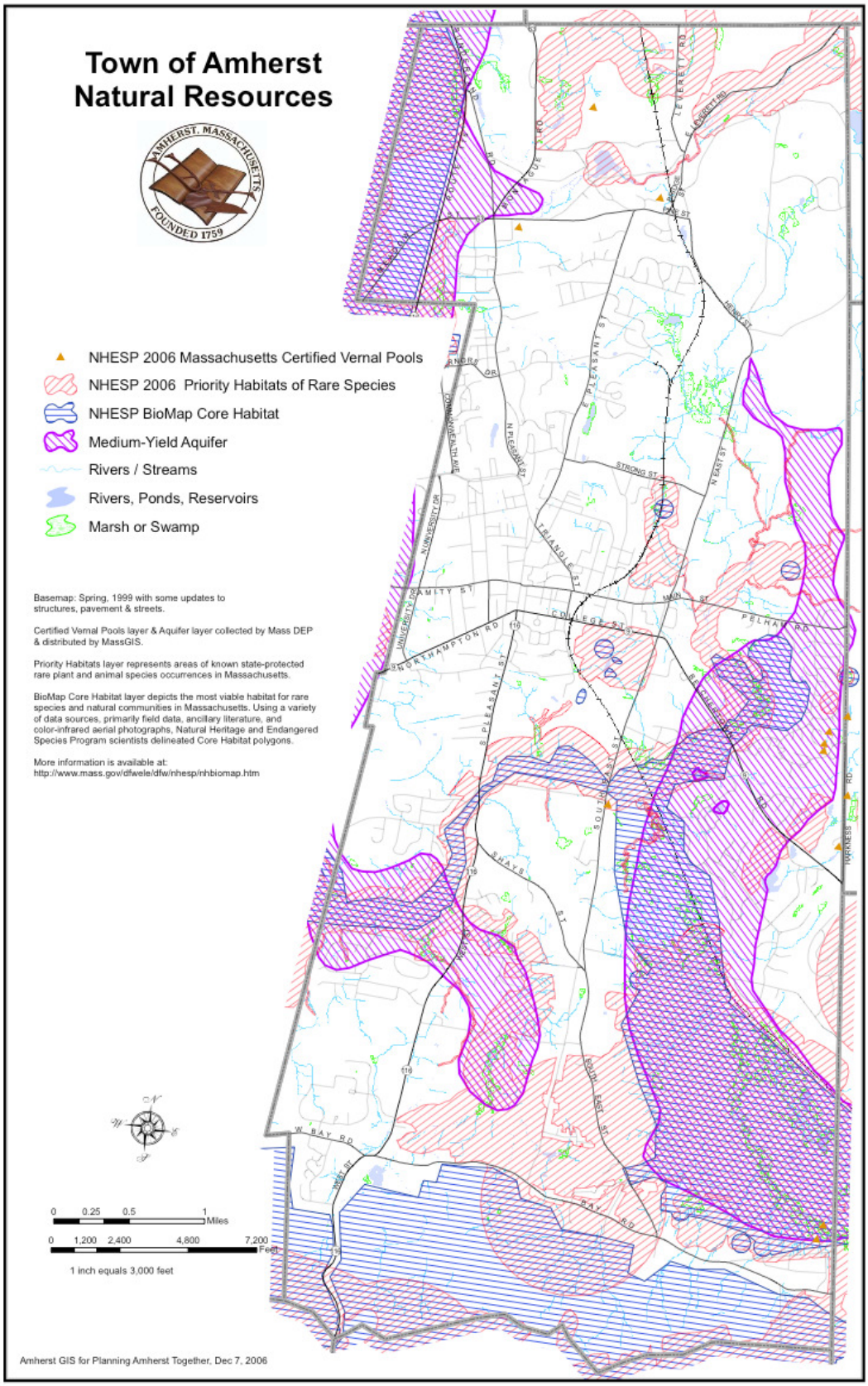
Natural Features

This section analyzes Amherst's natural features in terms of the following subsections:

- Topography
- Drainage Features
- Geology
- Wetlands & Vegetation
- Floodplains

Map 4.1 provides a visual depiction of Amherst's natural resources.

MAP 4.1: NATURAL FEATURES



Source: Town of Amherst

Topography

The Town of Amherst is surrounded by major topographical features: Mount Sugarloaf to the north, the Holyoke Range to the south, the Pelham Hills to the east, and the Connecticut River flood plain to the west. North Amherst experiences some of the greater topographical changes in Town amongst the flat hills. The Town Hall in Amherst Center stands atop an elevation of 312 feet above sea level and slopes east toward Mill Lane. A prominent ridge along South East Street and a mixture of hills and valleys makeup the topography of South Amherst. The topography of Amherst increases as it nears the Holyoke Range. The Town border with Granby coincides with the major summits in the Holyoke Range, reaching elevations as high as 1106 feet above sea level. (See Map 4.2 on page 4.8.)

Drainage Features

Amherst is located in the Connecticut River Drainage Basin. The Connecticut River is 407 miles long, flowing from the Connecticut Lakes in northern New Hampshire into the Long Island Sound in southern Connecticut. The streams, rivers, and ponds located throughout Amherst converge at the Connecticut River as it passes through Hadley. Each water body has an individual drainage basin based on topography that surrounds it. The runoff captured by the water bodies influences the quality of the Connecticut River.

The Massachusetts Department of Environmental Protection (MDEP) implements a five-year approach to protect the watershed quality. During the first three years, the existing water resources in the watershed are identified, researched, and assessed. In the fourth and fifth year, a plan is implemented and then evaluated. The program runs its full course and is then repeated. The MDEP is currently in its first year of identifying new water quality goals in the Connecticut River Basin.

Geology

The roots of Amherst's basic geology date back to the glacial ice sheet Lake Hitchcock that once covered the Connecticut River Basin. Clay, silt, and fine sand deposits up to 200 feet in thickness were left behind as the glacier moved. Sand and gravel deposits, known as outwash, lay beneath the fine grained soils.

Bedrock Geology. The bedrock is deep beneath the soils seen on the surface. The basic make up of the bedrock in the northern and central parts of Town is metamorphic and sedimentary, with sedimentary rock also in the center and the southern parts of Town.

Surficial Geology. The surficial geology consists of soils deposited above the bedrock. The properties of the soils differ due to different topography, even though they were formed from the same parent material. A soil's parent material is the disintegrated and partially weathered rock from which the soil has formed. The U.S. Department of Agriculture (USDA) Soil

Survey of Hampshire County was used to determined soil makeup of Amherst. The parent materials found in Amherst are as follows.

- Alluvial: Fine grained sediments that have been transported and deposited by rivers and streams.
- Glacial Till: Unsorted mixtures of clay, silt, sand and broken rock that have been transported and deposited by glacial ice.
- Outwash: Deposited by melt water from a glacier's retreating front. This material consists of particles ranging from silt to coarse gravel, with medium sized sands predominant.
- Lacustrine: Fine grained clays deposited by lakes. Varves, alternating thin layers of light-colored coarser grained sediment and dark-colored finer grained sediment, are common lacustrine deposits.

A majority of Amherst's soils fall into the category of outwash and lacustrine sediments. These soils are evident in northern, eastern, southern, and central parts of Amherst. The slopes of these soils range from 0 to 15 percent. A strip of alluvial material is present through the center part of Amherst, with slopes that range from 0 to 3 percent. Evidence of glacial till is present in the northeastern part of Amherst, near the Flat Hills, and is scattered throughout the central parts of Town. It is also the parent material in the Holyoke Range area. These soils experience greater slopes from 0 percent to 35 percent, with 45 percent slopes evident in the Holyoke Range.

Soil limitations include stone on the surface and steep slopes in northern parts of Amherst, slow permeability in the northern and central parts of Amherst, and rapid permeability in the southern parts of Amherst.

Wetlands and Vegetation

Wetlands are a critical feature in a town's landscape and provide multiple benefits for the people and the wildlife. As listed by the U.S. Environmental Protection Agency (EPA), wetlands serve the following functions:

- Water Storage: Wetlands absorb water, slowing the water's momentum and erosive potential and reducing the occurrence of flooding.
- Water Filtration: Wetland plants have the ability to absorb nutrients and toxins before it reaches groundwater and surface water. As a result, wetlands reduce the chance for bodies of water to experience eutrophication.
- Biological Productivity: Serves as a habitat to a variety of wildlife.

Wetland areas are determined based on soil types, vegetation, wildlife habitat, topography and other criteria. According to the MDEP, wetlands are present along rivers and water bodies in Amherst. The Natural Heritage and

Endangered Species Program (NHESP) estimates that rare wildlife habitats are found in the following wetland areas:

- Along Cushman Brook and Factory Hollow Pond
- Fort River
- Plum Brook
- Hop Brook
- Lawrence Swamp

Vegetation in the wetlands, particularly Lawrence Swamp, is a forest area that includes deciduous and coniferous trees, and shallow and deep marsh.

Vernal Pools. A vernal pool is a depression in the land that fills with water during a high water table period and acts as a temporary wetland. It generally freezes during the winter and dries out during the summer. Many organisms use vernal pools for various parts of their life cycles. Vernal pool species in the New England include fairy shrimp, wood frogs, and mole salamanders. Currently, there are 13 vernal pools located in Amherst.

Floodplains

Floodplains in Amherst are evident along brooks, rivers, and ponds that are scattered throughout the Town. Large 100-Year Flood Hazard Areas in Amherst (as determined by FEMA, the Federal Emergency Management Agency) are located along the following water bodies:

- Adams Brook
- Cushman Brook
- Factory Hollow Pond
- Fort River
- Lawrence Swamp
- Mill River

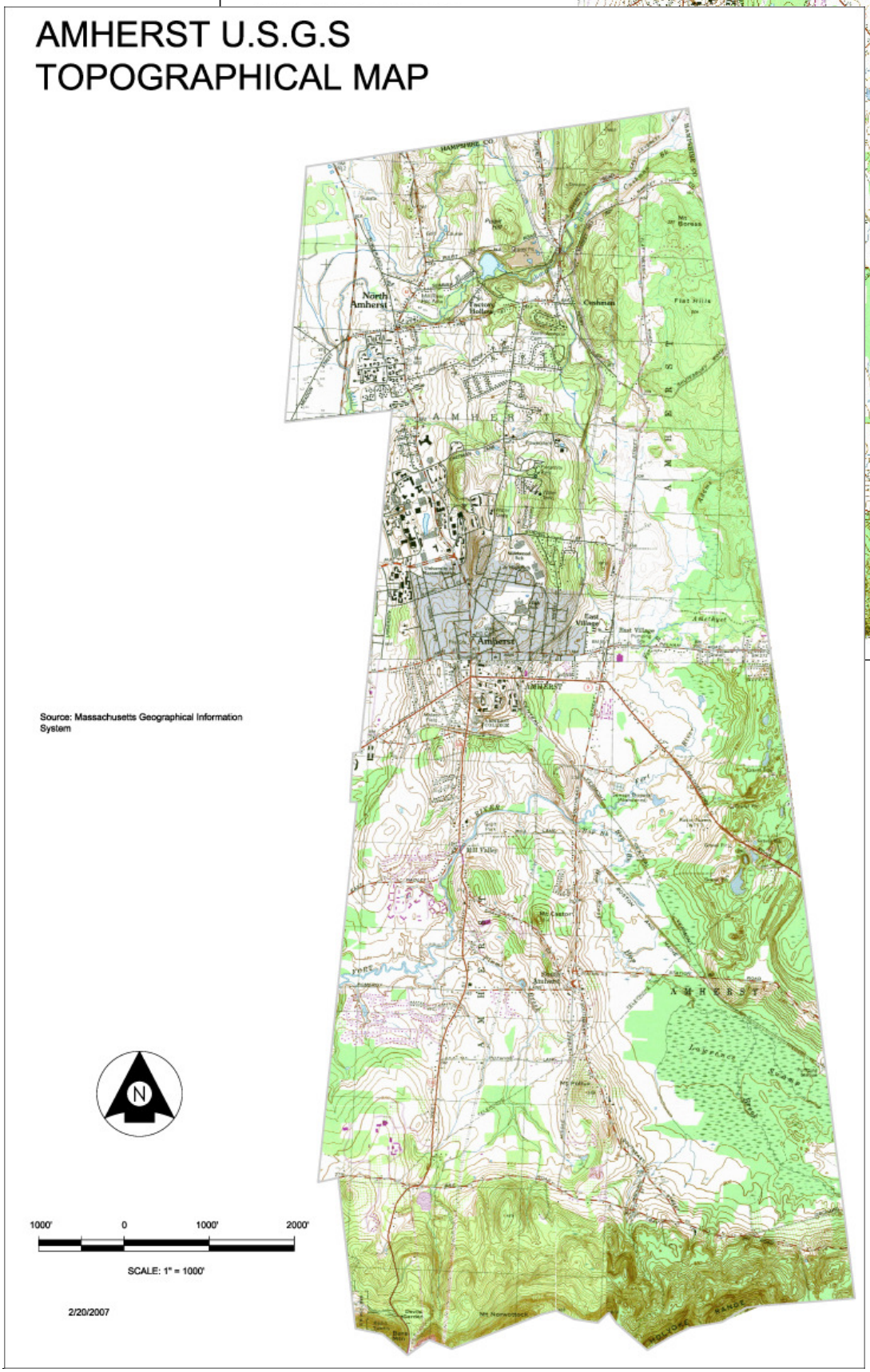
Water Resources

The Town of Amherst is scattered with rivers, brooks, streams, and ponds that add to its scenic appeal. Under the surface, Amherst sits upon three major aquifers that provide drinking water for the Town. It is important that the quality of these water sources is preserved and used wisely. In this section, water resources are defined as either surface water bodies (lakes, ponds, rivers and streams), or aquifers and public drinking water sources (groundwater wells and reservoirs).

Surface Water

According to the MDEP, approximately 0.3 percent of Amherst's land is covered by surface water. Over 30 lakes and ponds have been identified within Amherst using the USGS topographical map (see Map 4.2 on the following page.)

MAP 4.2: AMHERST



This is a standard United States Geological Survey (USGS) map. A complete guide to USGS topographic map symbols can be found at http://erg.usgs.gov/isb/pubs/booklets/symbols/topomapsymbols.pdf.

Source: Massachusetts G.I.S.

Rivers that pass through Amherst include the Mill River and Fort River, both major tributaries of the Connecticut River. Other streams and brooks dispersed throughout Amherst include:

- Adams Brook
- Amethyst Brook
- Baby Carriage Brook
- Cushman Brook
- Doolittle Brook
- Heatherstone Brook
- Hop Brook
- Montague Brook
- Plum Brook

Aquifers and Public Drinking Water Sources

There are three areas of potential medium-yield aquifers. The Lawrence Swamp Aquifer is the largest. It is located on the eastern part of Amherst, extending from the end of Henry St. to the southern part of Amherst near Bay Road. The edges of the aquifer are comprised of a confining clay layer providing significant groundwater recharge.

The Town's Public Drinking Water Wells are located in the Lawrence Swamp Aquifer, ranging in depths from 57 to 168 feet. Wells # 1, 2, 3, and 5 are located on the perimeter of the aquifer, where the clay and silt layer is discontinuous with sand and gravel deposits integrated throughout. This type of aquifer is considered semi-confined and is susceptible to contamination due to the absence of a continuous clay layer. The clay layer acts as a barrier to potential contaminates that enter the groundwater. Well #4 is located in the confined area of the aquifer and has low vulnerability to contamination due to the presences of a continuous clay layer. Each well is located in the DEP Zone II area. (See description in the sidebar at left).

Amherst's two surface public drinking water resources, the Atkins and Pelham Reservoirs, are located in Shutesbury and Pelham, respectively.

Zone II

The Massachusetts DEP uses Zone classification to identify and protect public groundwater sources. Zone II is defined as the "area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at safe yield, with no recharge from precipitation.)"

- http://www.mass.gov/mgis/ziis.htm

Potential Hazards to Water Resources

It is important to identify contamination threats to the groundwater and surface water to protect the public water supply sources. Land use in the Zone II area includes residential, agricultural, and light commercial and industrial. Potential threats to the sources include the following:

- Agricultural Runoff (high nutrient content, nitrogen and phosphorus, leading to surface water eutrophication)
- Beavers in surface water (risk of giardia lamblia and cryptosporidium)
- Hazardous Material and Storage Use
- Highway and Roadway Runoff (salt, gasoline, automobile debris)
- Pesticide use and storage
- Septic systems
- Stormwater

There are currently 121 sites or areas within Amherst that have experienced a chemical spill and are potentially contaminated according to the MADEP Standard Release Report. Fuel oil is the most common spill listed. It is important to identify and monitor contaminated or potentially contaminated sites in order to protect the groundwater sources. As shown in Table 4.3, a majority of the sites involved leaking underground storage tanks.

Table 4.3 Contaminated Sites in Amherst

Contaminant Source	# of Sites
Above Ground Storage Tank	4
Pipe	9
Transform	11
Underground Storage Tank	52
Vehicle/Tanker	7

Source: Massachusetts Department of Environmental Protection

In order to reduce the risk of public drinking water source contamination, Best Management Practices (BMPs) should be carried out by the Town. The MDEP has made the following recommendations in the Source Water Protection and Assessment Report for Amherst.

Zone I
The protective radius required around a public water well. The protective layer for Amherst wells is 400 feet.

- Inspect Zone I regularly, and when feasible, remove any non-water supply activities. (See sidebar at left.)
- Continue to educate residents on ways they can help protect drinking water sources.
- Work with emergency response teams to ensure that they are aware of the stormwater drainage in Zone II and watersheds when responding to spills or accidents.
- Partner with local businesses to ensure the proper storage, handling, and disposal of hazardous materials.
- Work with farmers in protection areas to make them aware of the water supply and to encourage the use of a Natural Resource Conservation Service (NRCS) farm plan to protect water supplies.

Farmland

Due to the Connecticut River floodplain to the west, particular areas in Amherst contain soil that is prime for farming and agricultural practices. Currently, Amherst has 2,566 acres of farmland. Agricultural Preservation Restrictions (APR) protect 1,841 acres of farmland. Locations of farm and agricultural land, both protected and unprotected, are based off of the 1999 Land Use Map. In the north, farmland is located along Meadow St., Route 116 and Sunderland Rd. In the central part of Town, farmland is present along North East St. and Strong St., Belchertown Rd, South East St., and

west of South Pleasant St. In the southern part of Town, existing farmland is along South East St. and Route 116.

Vulnerable Resources

Since 1971 Amherst has lost a total 1164 acres of forest farmland according to the *Valley Vision 2 Draft (2006).* This is primarily due to construction of new roads, shopping centers, and residential development. To prevent a constant decline of open space, Amherst plans to redirect development and growth to the village centers, and have open space separate these centers. This is consistent with Amherst's historical development patterns.

Amherst's primary strategy for protecting agricultural parcels is to secure them under the APR. The *2003 Draft Open Space & Recreation Plan* has listed the following farms as areas of high priority due to vulnerability:

- North East Street: 46-acre Hart Farm and 160-acre Hess Farm
- Meadow Street: 20-acre Andrews-La Verdiere property
- Sunderland Road: Mitchell and Szala property west of Route 116
- South East Street: 69-acre Gray Property, 50-acre Charles Thompson farm, and the 80-acre Cowles property
- West Street: 200-acre Hampshire College Farm and 19-acre Nanartonis property
- Belchertown Road: The Maplewood Farm and Ellis properties
- Pine Street: 40-acre Dziekanowski Farm

Regional Context

From a regional standpoint, loss of farmland and open space is a common trend in the Pioneer Valley. According to the *2006 Draft Valley Vision 2*, the region's farmland decreased from 111,314 acres in 1987 to 88,393 acres in 2002, a 20.6 percent decline.

As a region, the Pioneer Valley's developed land increased at a rate of 49.3 percent between 1970 and 2000. Amherst's developed land has increased at a rate of 47 percent, almost as high as the regional rate.

The Pioneer Valley Planning Commission (PVPC) recognized the negative affect development was having on open space and farmland in the region. In 1997, the plan *Valley Vision* was put forth. *Valley Vision* provided a land use plan for the cities and towns in the Hampden and Hampshire counties. The *2006 Draft Valley Vision 2* lists smart growth strategies to help protect farmland and open space to be utilized at a local level.

Conservation Areas

Since 1963, Amherst has worked to acquire conservation lands that protect wildlife habitat, lands with high scenic value, and lands that provide recreation and educational value. According to the Town of Amherst Protected Land Map, 2,573.4 acres of the Town's land are protected for

conservation purposes, representing approximately 15 percent of the Town. Of the protected land, 1,703.5 acres are protected through Town conservation efforts. Among the lands the Town has conserved, a few of the larger parcels protected include the 180-acre Simmons Farm Conservation Area, the 90-acre Cherry Hill Golf Course and the 51-acre Haskin Meadow Conservation Area. An additional 896.9 acres are protected by the Massachusetts Department of Conservation and Recreation (MDCR). The DCR is responsible for protecting the Holyoke Range area.

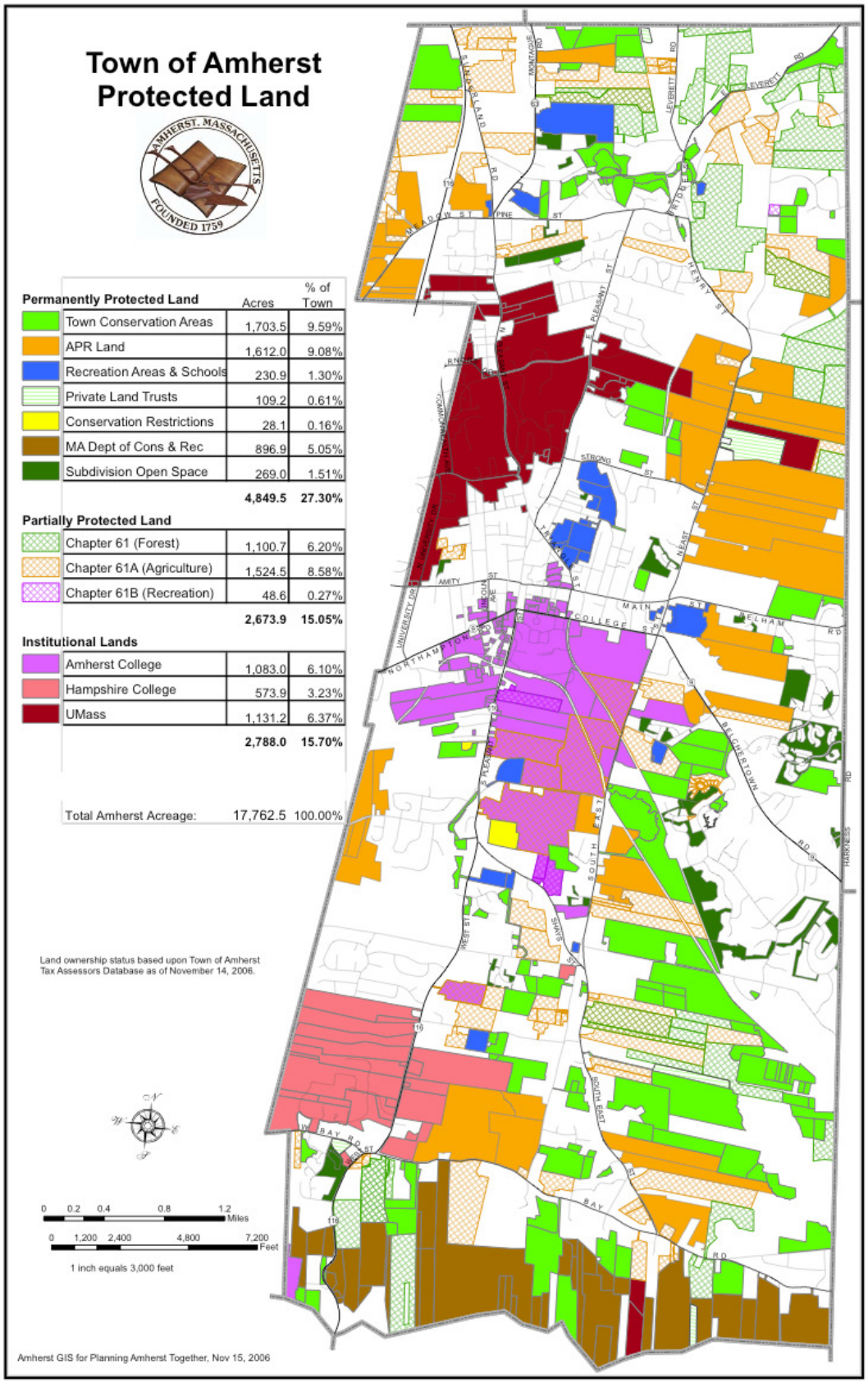
Vulnerable Resources

The *2003 Draft Open Space & Recreation Plan* was developed by Conservation Commission, and the Leisure Services and Supplemental Education Commission, among others. It has developed a list of high priority areas to be protected under conservation due to vulnerability. These areas include:

- Pulpit Hill
- Cushman Brook Green Belt
- Plum Brook Green Belt
- Holyoke Range – to protect the land close to Bay Road to prevent development that would break-up the forested land.

Map 4.3 on the following page shows Amherst's protected lands.

MAP 4.3: PROTECTED LAND



Source: Town of Amherst

Historical and Cultural Resources

Amherst is home to a rich collection of historic and cultural resources. The Town is internationally renown for its literary heritage, as it has been home to numerous artists and intellectuals including Emily Dickinson, Robert Frost, Noah Webster, Henry Ward Beecher, David Grayson, Howard and Lillian Garis, and Robert Francis, among others. Amherst is also home to numerous historically significant structures and cultural attractions.

The *2005 Amherst Preservation Plan* identifies past preservation efforts and sets goals for the future to preserve Amherst's historical and cultural resources. This section summarizes the plan and provides insight on what Amherst has accomplished and strives to complete.

The ultimate goal of the Amherst Historical Preservation Commission is to prevent the loss of important historic resources, increase the inventory of historic resources, protect and enhance historical resources during development, and increase the community knowledge of historic resources. In 2001, the Community Preservation Act (CPA) was passed at a Town Meeting. The CPA places a 1 percent property tax on Amherst real estate, which is supplemented by a 100 percent match from the State. The result is a significant increase in funding for affordable housing, land protection, historic preservation, and recreation.

Amherst's efforts to preserve historic and cultural resources date back to the 1800s. These include both private and public preservation efforts.

Private Preservation Efforts

- The Amherst Ornamental Tree Association was formed in 1867 to improve the overall appearance of public place. This included tree plantings, grading, drainage improvements and sidewalks.
- The Amherst Historical Society and Strong House Museum opened in 1916 to house artifacts from the Town's history. The collection serves as one of the principal sources of historical artifacts pertaining to Amherst's history
- The Emily Dickinson Museum consists of two historic houses on Main St. The Homestead is the poet's original birthplace and home and became a National Historic Landmark in 1963. The Evergreens, located next door, was the home of her brother and his family. The Museum draws thousands of yearly visitors and is one of the most popular historic sites visited by tourists in the Town.

Libraries and Collections

Amherst's history is also preserved through several library collections:

- The Jones Library serves as a regional center for historical and genealogical research.
- The UMass library archives historical materials about the Town and University. It also houses the W.E.B. Dubois collection, and the UMass archaeological collection.
- The Amherst College Archives are housed at the Robert Frost Memorial Library. President John F. Kennedy was the speaker for the library's groundbreaking ceremony in 1963.

Public Preservation Efforts

The Historical Commission was formed in October 1972, and has worked diligently at creating a Town-wide inventory. Amherst has used a method designed by the Massachusetts Historical Commission (MHC) to complete the inventory. The MHC designed forms included potential

inventory for areas, buildings, burial grounds, bridges, structures, streetscapes, parks, etc.

Currently, 80 percent of the Town's historic and cultural resources are included in the inventory. Those not yet inventoried include properties on Montague Road, Northampton Road, and Woodside Avenue. Additionally, only 15 Ancient Native American sites and 6 archaeological sites have been reported, which is low compared to state averages.

National Register

Amherst has participated in the National Register since 1966. Seven individual properties and nine districts have been listed. They are as follows:

Individual Properties:

- Emily Dickinson House – 1966
- The Evergreens – 1977
- Ithamar Conkey – Abiel Stevens House – 1979
- Theodore Baird House – 1985
- The Strong House – 1984
- Goodwin Memorial African Methodist Episcopal Zion Church – 2000
- West Cemetery – 2000

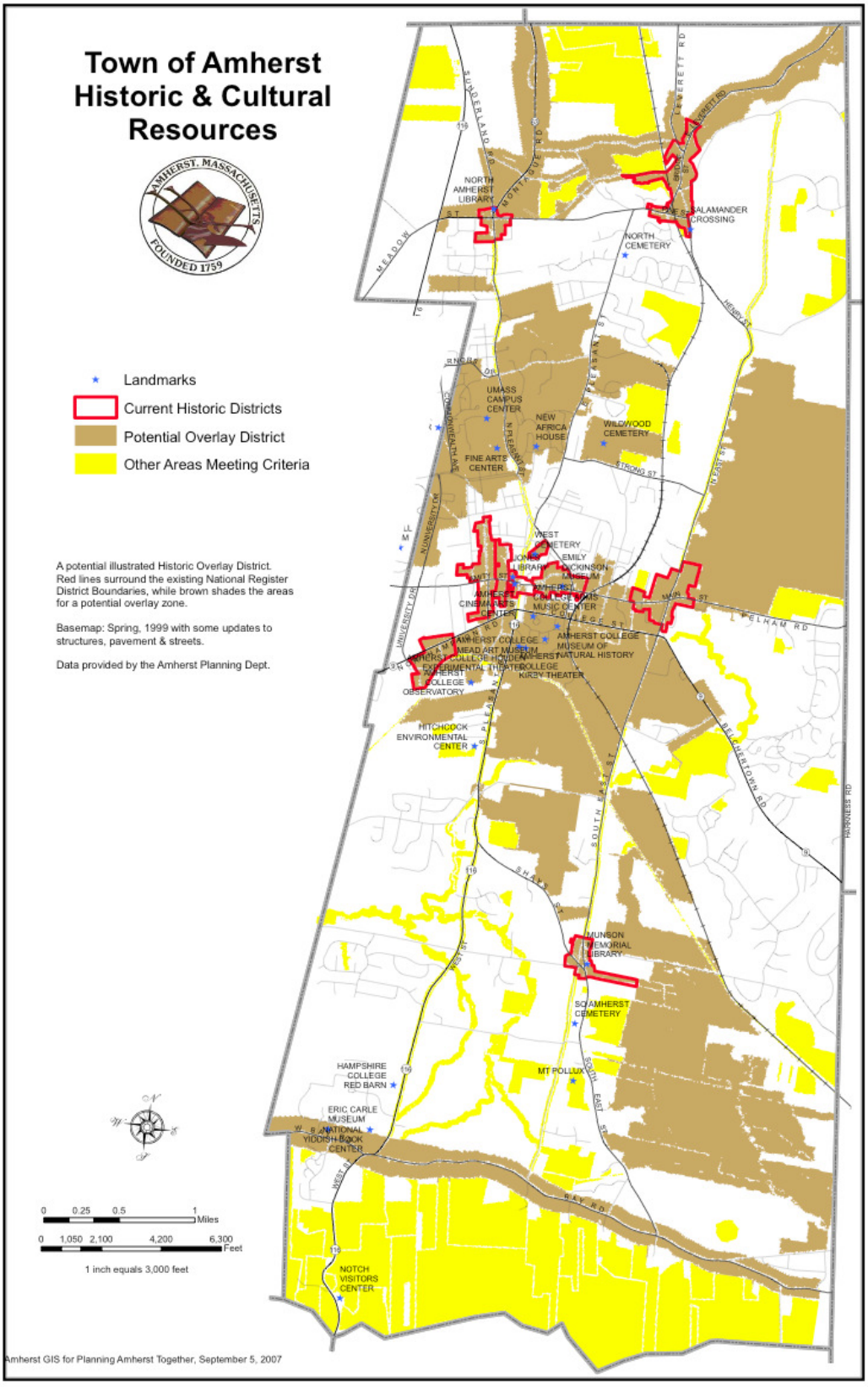
Districts:

- East Village Historic District – 1986
- Lincoln-Sunset Historic District – 1991
- Amherst Central Business District – 1991
- North Amherst Center Historic District – 1991
- Cushman Village Historic District – 1992
- Dickinson Historic District – 1992
- Prospect-Gaylord Historic District – 1993
- South Amherst Common Historic District – 1995
- Westside Historic District – 2000

Map 4.4 on the following page depicts the locations listed above. In addition to the extensive recommendations and action steps set forth in the 2005 Amherst Preservation Plan, in order to continue preserving Amherst's historic and cultural resources, the citizens of Amherst also suggested the following strategies during the Fall 2006 Idea Gathering process:

- Identify all areas/sites of cultural and historic importance
- Carefully balance historic character of Town with the need to consider economic development
- Limit house size as appropriate
- Cluster development near village centers to allow open space to remain between villages
- Limit roadway and intersection expansion
- Use other cities in the US that emphasize preservation as models

MAP 4.4: HISTORIC AND CULTURAL RESOURCES



Source: Town of Amherst

University and College Resources

Amherst's culture can be attributed, in part, to the presence of three educational institutions in Town. Amherst College, Hampshire College, and the University of Massachusetts not only add diversity with their student populations, but are stewards of cultural, historical, and natural resources. The following list provides a sampling of the cultural resources available at these educational institutions. More information about ongoing cultural activities, events, and performances can be found on their respective websites.

Amherst College (www.amherst.edu)

- Mead Art Museum, located at Rt. 9 and Rt. 116 intersection at Amherst College. The museum houses art from Amherst College acquired since 1839. Museum hours, exhibitions, and tours available are listed on the website: www.amherst.edu/mead
- Museum of Natural History, located at Rt. 9 and Rt. 116 intersection at Amherst College. The museum has been collecting items since the 1830s. It has exhibits on vertebrates and invertebrates, minerals and other geologic items, and anthropological material. The museum holds historic and scientific significance. Museum hours and tours are listed on the website: www.amherst.edu/museumofnaturalhistory

Hampshire College (www.hampshire.edu)

- Hampshire College Art Gallery located at the Johnson Library Center. The Gallery includes environmental installations, dance and performance pieces, and video presentations. The website provides gallery hours and exhibits: http://www.hampshire.edu/cms/index.php?id=1067

University of Massachusetts, Amherst (www.umass.edu)

- Founded in 1975, the UMass Fine Arts Center offers educational, visual, and performing arts programs. Its University Gallery holds drawings, prints, and photographs from the second half of the 20th century. Numerous performances are held each year and draw audiences from the campus, Five Colleges, and the surrounding region. More information can be found at http://www.umass.edu/fac/.
- The Natural Resources and Environmental Conservation Program is an extension of UMASS. It provides information on watersheds and water quality, wetlands, biodiversity, forest and land management, land use and environmental education. The services provided are for training and technical assistance and allow individuals and committees to get involved in

conservation and environmental education. Website: http://www.umass.edu/nrec

- The UMass campus has functioned as an arboretum since the late 19th century, when the university president brought plants from Japan. It was later named the Waugh Arboretum after Frank Waugh, the first head of the UMass Landscape Architecture department.